

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte MIKI ADACHI

Appeal No. 2002-0293
Application No. 09/192,564

HEARD: AUGUST 13, 2002

Before ABRAMS, MCQUADE and BAHR, Administrative Patent Judges.
BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 7, 8, 10 and 13-15. Claims 1-6, 9, 11, 12 and 16-18 stand withdrawn from consideration as being directed to a non-elected invention. No other claims are pending in this application.

We REVERSE.

BACKGROUND

The appellant's invention relates to a diamond film having "a polished surface of excellent smoothness" (specification, page 1). Further understanding of the invention may be obtained from a reading of independent claims 7 and 13, which are reproduced in the Opinion section of this decision.

The sole prior art reference relied upon by the examiner as evidence of obviousness is:

Malshe

5,472,370

Dec. 5, 1995

The following rejection is before us for review.

Claims 7, 8, 10 and 13-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Malshe.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejection, we make reference to the answer (Paper No. 14) for the examiner's complete reasoning in support of the rejection and to the brief and reply brief (Paper Nos. 13 and 16) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art reference, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

The two independent claims before us on appeal read as follows:

7. A diamond film having a surface roughness (Rms) of from 0.5 to 10.0 nm.

13. A diamond film having a surface roughness (Rms) of from 0.5 to 3.0 nm.

In rejecting appellant's claims under 35 U.S.C. § 103, the examiner relies solely on the teaching in the background section of the Malshe patent, which deals with polishing of diamond films, that, "[w]hile ion beam methods produce a surface finish on the order of 0.005 microns, the surface roughness is non-uniform due to ion-beam non-uniformity" (column 3, lines 54-57). While the examiner has rejected claim 7 as being unpatentable over Malshe and not anticipated by Malshe, it appears that the examiner's position is, in fact, that the diamond film produced by the ion beam methods referred to in the Malshe patent meets all of the limitations of claim 7 (see answer, page 4).

Appellant argues that, because Malshe does not define the terminology "surface finish," Malshe fails to suggest any surface roughness, much less the recited "surface roughness (Rms)" (brief, pages 5-6). In particular, appellant, referring to the discussion of surface texture in Metals Handbook Desk Edition, pp. 27-20 through 27-22 (American Society For Metals, 1985), appended to the brief, contends that:

Surface finish is a colloquial term widely used to denote the general quality of a surface, Surface finish is not specifically tied to the texture or characteristic pattern of the surface, nor is it tied to specific roughness values; however, a "good" finish implies low roughness values and vice versa. The term surface finish is not as precisely defined as are the terminologies used in the American National Standard, nor is it necessarily expressed numerically [Metals Handbook, p. 27-21].

To the extent that appellant is arguing that one of ordinary skill in the art of polishing would not understand the surface finish value of “on the order of 0.005 microns” as used by Malshe as referring to a surface roughness on the order of 0.005 microns (5 nm), we do not consider this argument to be well taken. From our perspective, one of ordinary skill in the art, reading the above-mentioned sentence of Malshe as a whole would have understood that, by “surface finish on the order of 0.005 microns,” Malshe meant a surface roughness on the order of 0.005 microns (5 nm).

We do, however, share appellant’s view that it is not apparent whether the surface finish/roughness value cited by Malshe refers to an arithmetic average (R_a) surface roughness value or a root mean square (Rms) surface roughness value (R_q). As pointed out by the Metals Handbook (p. 27-22), the ratio of the root mean square surface roughness value (R_q) to the arithmetic average surface roughness value (R_a) can vary anywhere from 1.16 to at least as high as 2.10, depending on the type of polishing process used. Thus, while it is certainly possible, and even in our view likely¹, that the ion beam polished diamond film referred to in the background section of the Malshe patent does have a surface roughness (Rms) within the range of from 0.5 to 10.0 nm as called for in claim 7, the disclosure of the Malshe patent is too speculative to permit a conclusion that this is necessarily the case and the examiner has not provided any additional evidence to establish that one of ordinary skill in the art would

¹ Table 1 on page 27-22 of the Metals Handbook notes that a practical first approximation for the ratio R_q/R_a for most processes is 1.25. Thus, even assuming that the surface finish/roughness value referred to by Malshe is an arithmetic average value, the root mean square (Rms) value would likely still fall within the range recited in claim 7.

have understood that this, in fact, would be the case. In regard to the examiner's remark on page 4 of the answer that ion beam polishing is only one option mentioned by Malshe, and that other options are available to one of ordinary skill in the art to reduce the surface roughness below 5 nm successfully, we note that Malshe does not indicate that any of the other polishing techniques mentioned therein produces a surface roughness of 5 nm or better² and the examiner has provided no evidence that such a technique was known in the art at the time of appellant's invention. Rejections based on 35 U.S.C. § 103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

For the foregoing reasons, we conclude that the evidence adduced by the examiner is insufficient to establish a prima facie case that Malshe teaches or suggests a diamond film having a surface roughness within the range recited in claim 7, let alone a surface roughness within the narrower range of 0.5 to 3.0 nm recited in claim 13. Thus, we are constrained to reverse the examiner's rejection of claims 7 and 13, as well

² In fact, the technique disclosed as Malshe's invention yields a surface roughness of about 0.4 to 0.7 microns (400 to 700 nm), well outside the range called for in claim 7.

as claims 8 and 10, which depend from claim 7, and claims 14 and 15 which depend from claim 13.

CONCLUSION

To summarize, the decision of the examiner to reject claims 7, 8, 10 and 13-15 under 35 U.S.C. § 103 is reversed.

REVERSED

NEAL E. ABRAMS
Administrative Patent Judge

JOHN P. MCQUADE
Administrative Patent Judge

JENNIFER D. BAHR
Administrative Patent Judge

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